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Computational tools in algebraic geometry are key to generating new conjectures and providing a means for solving problems in applications such as integrable systems and optimization. Recent features in Sage (<http://www.sagemath.org>) for performing computations with Riemann theta functions and algebraic curves provide steps towards solving a large class of these problems. In this talk we will discuss current and future developments in Sage for computational algebraic geometry and examine two applications in particular: generating genus two and three solutions to the Kadomstev–Petviashvili equation and computing determinantal representations of homogenous plane curves. (Received August 30, 2011)